agonist versus antagonist cycles for patients <35 years who were overweight (BMI 25.0-29.9 kg/m^2) or had class II (BMI 35.0-39.9 kg/m^2) or class III (BMI ≥40 kg/m^2) obesity; comparisons for older ages were not significant. Among non-Hispanic white and non-Hispanic black women with class II or class III obesity, LBRs were also higher for agonist versus antagonist cycles. Among women with a prior spontaneous abortion, LBRs were significantly higher for those using agonist vs antagonist protocol for all BMI categories. Cycle cancellation rates were higher for antagonist versus agonist cycles for each BMI category; however, cancellation due to ovarian hyperstimulation occurred less frequently in the antagonist cycles for each BMI category.

CONCLUSIONS: Overall, pregnancy and live birth rates were higher in agonist versus antagonist cycles in all BMI categories. Among women who had class II or III obesity, use of agonist protocol resulted in higher LBRs in those who were <35 or were non-Hispanic white or non-Hispanic black. Cancellation due to hyperstimulation was less frequent in the antagonist than agonist cycles, as expected, but this must be weighed with improved IVF outcomes with the agonist protocol.

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EFFECT OF ENDOMETRIAL THICKNESS ON LIVE BIRTH RATE IN BOTH FRESH AND FROZEN BLASTOCYST TRANSFERS.

T. Place,[a] R. Mejia,[b] A. E. Sparks,[c] H. E. Duran,[d] K. M. Summers,[e] P. Ten Eyck,[f] B. J. Van Voorhis.[g] [a]ObGyn, University of Iowa, Iowa City, IA; [b]University of Iowa, Iowa City, IA; [c]Obstetrics and Gynecology, University of Iowa, Iowa City, IA; [d]Ob/Gyn, University of Iowa, Iowa City, IA; [e]Research Assistant, Iowa City, IA; [f]College of Public Health, University of Iowa, Iowa City, IA; [g]Ob-Gyn, University of Iowa College of Medicine, Iowa City, IA.

OBJECTIVE: Prior studies investigating the relationship between a thin endometrium and IVF outcomes have overwhelmingly been performed in fresh, cleavage stage embryo transfers. Given the recent trend toward frozen blastocyst transfers, we aimed to determine whether endometrial thickness predicts live birth rate in both fresh and frozen blastocyst stage embryo transfers.

DESIGN: Retrospective cohort study.

MATERIALS AND METHODS: First fresh or frozen IVF blastocyst transfers at the University of Iowa between 9/2011 and 9/2017 were included in this study. Donor cycles, PGS cycles, and cycles with incomplete information were excluded. Endometrial thickness was measured on the day of hCG trigger +/- 1 day (for fresh cycles) or at the end of estrogen priming (just prior to progesterone administration) in a frozen transfer cycle. Statistical analysis was performed using a generalized linear mixed model. We controlled for potential confounding variables including age, weight/BMI, embryo quality, days of stimulation, number of embryos transferred, and parity.

RESULTS: In fresh blast transfers (n=1042), endometrial thickness (median=10.9 mm; range 2.6-22 mm) was significantly correlated with live birth rate when controlling for other confounding factors. For every 1 mm increase in endometrial thickness, the odds of live birth increased by 7.9% ($p<0.0001$). The fresh live birth rate was negatively affected by female age and increasing days of stimulation, and positively affected by higher blastocyst stage and trophectoderm grade (A better than B/C). In frozen blast transfers (n=566), endometrial thickness (median 8.7 mm; range 4.9-18.9 mm) was not significantly correlated with live birth rate when controlling for the same factors. Increasing female age negatively affected, and increasing number of embryos transferred positively affected the live birth rate after frozen blastocyst transfers. Patient weight and BMI did not affect either the live birth rate or endometrial thickness in either dataset.

CONCLUSIONS: We have shown that a thicker endometrium on the day of trigger is associated with improved live birth rates after fresh blastocyst transfer. In frozen transfers, there was a trend toward improved live birth rate with increasing endometrial thickness, but this was non-significant. These data suggest that endometrial thickness is more important in fresh than in frozen embryo transfers. However, these results could be explained by the fact that frozen transfers are generally not performed at our institution until an endometrial thickness of >6.0 mm is achieved. Further studies will be required to clarify these differences.

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WITHDRAWN

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IN FREEZE ALL EMBRYOS (FAE) CYCLES DUE TO ENDOMETRIAL FLUID (EF), LIVE BIRTH RATES IN SUBSEQUENT FROZEN EMBRYO TRANSFER (FET) ARE COMPARABLE TO THOSE OF CONTROLS, DESPITE HIGH RATES OF EF RECURRENCE AND CYCLE CANCELLATION.

L. Preaubert,[a,b] T. Shaulov,[a] M. Stutz,[c] R. Antaki,[a,b] C. Grysole,[b,a] S. Phillips,[a,b] L. Lapensee.[a,b] [a]OVO Clinic, Montreal, QC, Canada; [b]University of Montreal, Montreal, QC, Canada; [c]Scientific Affairs, JSS Medical Research, St-Laurent, QC, Canada.

OBJECTIVE: We aimed to compare the clinical outcomes of subsequent FETs between patients having had FAE for endometrial fluid (EF) and controls having had a FAE for other indications, including the recurrence rate of EF and live birth rates (LBR) during subsequent frozen cycles.

DESIGN: A retrospective cohort study including all patients with FAE for EF at a university-affiliated private IVF center between 2010 and 2016.

MATERIALS AND METHODS: Controls were randomly generated cycles having had FAE for other indications during the same period. Gestational carriers, PGD/PGS cycles, egg donation cycles, patients having no embryo to transfer or hydrosalpinx were excluded. The primary outcome was cumulative LBR (CLBR) per started FET cycle and per patient. Secondary outcomes included rates of EF recurrence, cancellation, pregnancy rate (PR), and pregnancy loss rate. Between-group differences were ascertained with Chi-Square or Student's t-test, as appropriate.

RESULTS: A total of 83 patients with FAE for EF and 219 controls were included. Population characteristics were comparable between the two groups. In controls, the indications for FAE included OHSS (46%), elevated progesterone (37%), uterine causes (9.1%) and other (7.3%). The endometrial fluid rate in three subsequent FET cycles was significantly higher in the study group compared to the control group: (15.7% vs. 0.5%, $p<0.001$; 22.9% vs. 0%, $p<0.001$; 17.3% vs. 1.8%, $p=0.02$). Cancellation rates in subsequent FET cycles were significantly higher in the study group compared to the control group: 18.1% vs. 4.1%, $p<0.001$; 22.9% vs. 8.5%, $p=0.02$. Main cumulative outcomes are shown in the Table. The PR, pregnancy loss rate and LBR were comparable between the two groups. However, in patients with FAE for EF presenting with at least one EF recurrence during subsequent FETs, cumulated PR per FET cycle was 16.4% and CLBR per FET cycle was 5.4%.

Freeze-all cycle cumulative outcomes (n=302).

	Patients with FAE for EF (n=83)	Controls (n=219)	*P*-value
Mean number of FET	2.16 ±1.5	2.01 ± 1.3	0.40
Mean total number of ET	2.49 ± 1.8	2.43 ± 1.5	0.79
Recurrence of EF per FET	18.6% (33/177)	1.1% (5/441)	<0.001
Cancellation per FET	19.8% (35/177)	8.2% (36/441)	<0.001
Cancellation per patient	42.2% (35/83)	16.4% (36/219)	<0.001
Pregnancy per FET	34.5% (61/177)	33.8% (149/441)	0.87
Pregnancy per patient	73.5% (61/83)	68% (149/219)	0.36
Clinical pregnancy per FET	27.7% (49/177)	28.8 (127/441)	0.78
Live birth per FET	18.6% (33/177)	23.4% (103/441)	0.20
Live birth per patient	39.8% (33/83)	47% (103/219)	0.26
Number of FET per live birth	5.4	4.3	0.20

CONCLUSIONS: Despite higher rates of EF recurrence and cycle cancellation, patients with FAE for EF ultimately have comparable pregnancy and LBR to those having had a FAE for other indications. Nonetheless, patients presenting with at least one EF recurrence during subsequent FETs seem to have lower PR and LBR.

References: N/A.

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PREDICATION AND SIMULATION FOR THE PROBABILITY OF LIVE BIRTH OUTCOME IN FROZEN EMBRYO TRANSFER. J. An,[a] Q. Lu,[b] Y. Zheng,[a] Y. Wang,[a] J. Zhang.[a,c] [a]Academy for Advanced Interdisciplinary Studies, Peking University, Beijing, China; [b]Reproductive Medical Center, Peking University People's Hospital, Beijing, China; [c]College of Engineering, Peking University, Beijing, China.

OBJECTIVE: To build a predictive model to estimate the probability of live birth outcome in frozen embryo transfer (FET).

DESIGN: Retrospective study.

MATERIALS AND METHODS: 2194 FET cycles from Jan 2012 to Dec 2015 were recruited in Reproductive Medical Center, People's Hospital, Peking University. 816 cycles (37.2%) of FET outcomes were live births and 1378 cycles (62.8%) of FET outcomes failed. Random forest strategy was employed to build the predictive model. 80% samples were randomly used as training sets, and the remaining 20% samples were used as test sets. We compared the proposed model with the previous Templeton model (Age-T)[1], which is one of few reputed live birth prediction models. To verify the consistency of the trained model, ten independent random training procedures were carried out, and the mean and standard deviation of accuracy were measured. Moreover, the performance of this model as evaluated by using the mean and standard deviation of receiver operating characteristic curve (ROC) and area under the curve (AUC).

RESULTS: Nine dominant factors, including age, BMI, homeostasis model assessment of insulin resistance(HOMA-IR), basal luteinizing hormone, basal follicle stimulating hormone, basal estradiol, endometrial thickness, the number of embryo transfers and the total number of embryos, were automatically extracted from 34 candidate factors. The accuracy of our predictive model is significantly higher than the Age-T model (85.1% $\pm$ 1.2% vs. 64.7% $\pm$ 0.8%, N=10, p<0.001), while the AUC is remarkably larger than the Age-T model (0.91 $\pm$ 0.01 vs. 0.63 $\pm$ 0.01, N=10, p<0.001).To visualize the predicted outcome, flexible plots reflecting the probability of live birth outcome with the nine dominant factors were automatically exhibited using the proposed model. The desired parameters for individual FET and corresponding treatment recommendations could also be ergodically estimated.

CONCLUSIONS: The proposed model based on random forest strategy could provide more efficient performance for the prediction of FET. With the advanced flexible plots, the predictive model could potentially offer doctors a valuable simulation tool to determine the desired parameters of the nine factors in FET.

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INITIAL SERUM HUMAN CHORIONIC GONADOTROPIN LEVELS PREDICT LIVE BIRTH OUTCOMES FOLLOWING FROZEN EMBRYO TRANSFER WITH AND WITHOUT PREIMPLANTATION GENETIC TESTING FOR ANEUPLOIDY (PGT-A). S. N. Dolitsky,[a] S. A. Neal,[b] M. Olcha,[c] K. Hong,[d] M. D. Werner,[e] S. Morin,[f] A. W. Tiegs,[g] L. Sun,[h] R. Scott.[i] [a]Obstetrics and Gynecology, Robert Wood Johnson School of Medicine, New Brunswick, NJ; [b]IVI/RMA, Basking Ridge, NJ; [c]Albert Einstein College of Medicine, Bronx, NY; [d]IVI-RMA of New Jersey, Morristown, NJ; [e]REI, IVI-RMA NJ, Basking Ridge, NJ; [f]Reproductive Medicine Associates of New Jersey, Basking Ridge, NJ; [g]REI, RMANJ, South Orange, NJ; [h]Foundation for Embryonic Competence, Basking Ridge, NJ; [i]IVI RMA, Basking Ridge, NJ.

OBJECTIVE: Initial serum human chorionic gonadotropin (hCG) levels have an established association with IVF pregnancy outcomes[1-3]. However, many studies that have examined this association involved fresh transfers, transfer of multiple embryos, and embryos at varying stages of development. As contemporary practice patterns have shifted towards frozen transfer of a single blastocyst, evaluating the predictive value of initial hCG levels in this population is of interest. Additionally, it is not known if the predictive value of the initial hCG level is different for embryos that have undergone PGT-A. The objective of this study is to evaluate early serum human chorionic gonadotropin levels as a predictor of live birth following frozen embryo transfer (FET) of a single blastocyst with and without PGT-A.

DESIGN: Retrospective cohort study.

MATERIALS AND METHODS: All FETs of a single blastocyst at a large IVF center between 2010 and 2016 were reviewed for inclusion. Only those FET cycles resulting in a positive hCG nine days post-transfer were included in this analysis. Initial hCG levels were stratified and live birth rates were analyzed. Chi square analysis was used to compare live birth rates for each hCG category following transfer of embryos with and without PGT-A.

RESULTS: A total of 5280 FET cycles were included and 3417 (64.7%) of those cycles resulted in live birth. The mean hCG for a pregnancy resulting in live birth was 185 ($\pm$101.4) versus 60.7 ($\pm$76.1) mIU/mL for a non-viable gestation (P<0.01). Table 1 displays the live birth rate following FET of embryos with and without PGT-A, stratified by hCG level 9 days post-transfer. Initial serum hCG levels < 50 mIU/mL were associated with reduced live birth rates. For initial hCG levels between 50 and 150 mIU/mL, the live birth rate was approximately 10% higher following transfer of a genetically screened embryo.

Live Birth Rates

Initial hCG (mIU/mL)	Live birth rate with PGT-A (n=3,592)	Live bith rate with no PGT-A (n=1,688)	P-value
0.1-50	94/779 (12.1%)	48/510 (9.4%)	0.14
50.1-100	377/534 (70.6%)	163/269 (60.6%)	<0.01
100.1-150	549/688 (79.8%)	199/283 (70.3%)	<0.01
150.1-200	487/567 (85.9%)	207/244 (84.8%)	0.70
>200	947/1024 (92.5%)	346/382 (90.6%)	0.24

CONCLUSIONS: Even when initial serum hCG levels nine days after FET are low, there is still a chance of live birth. When the initial hCG level is between 50 and 150 mIU/mL, live birth rates are significantly higher with genetically screened embryos.

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